A Method for Operating a Gas Burner

The invention relates to a method for operating a gas burner according to the preamble of claim 1.

Gas burners normally comprise an electric or electronic ignition means and a flame monitoring means which normally measures an ionization current induced by the burner flame and, dependent on this ionization current, indicates the presence or absence of the burner flame.

There also exist controllers for gas burners which use the ionization current for guaranteeing a high combustion quality. In order to ensure an optimum and complete combustion of the fuel, i.e. the gas, within the gas burner, the latter has to be provided with an appropriately balanced gas/air mixture. For instance, the prior art discloses control methods using an ionization signal of a sensor projecting into the burner flame for adapting the gas/air mixture to, e.g., different gas qualities thereby adapting the gas/air mixture to the quality of the gas provided by the gas supply and guaranteeing a high combustion quality in the end. With respect to this, it can be referred to the DE-A-44 33 425, DE 39 37 290 A1, as well as the DE 195 39 568 C1.

In the known methods for operating a gas burner in which an ionization signal is used, there does, however, arise the problem that with increasing operating duration, the ionization signal provided by a sensor becomes unreliable. Then, a reliable information on the combustion conditions actually prevailing in the burner is no longer possible.

Proceeding from this, the present invention is based on the problem of providing a new method for operating a gas burner.

In accordance with the invention, the problem is solved by a method comprising the features of claim 1.

Preferred further developments of the invention are contained in the subclaims and the description.

The method according to the invention is based on the finding that the sensor supplying the ionization signal ages during the burner operation as a result of dirt deposited on the sensor. Further aging phenomena of the sensor may occur due to chemical decomposition or the like. In the case of such an aging, the signal of the ionization sensor is no longer reliable, since the electric behavior of the sensor changes.

The idea according to the invention is based on the further finding that each burner has a specific characteristic of the ionization current over the modulation area of the gas burner. In other words, the ionization current is lower during partial-load operation of the gas burner than during full-load operation of the gas burner. Moreover, the aging of the sensor has a different effect on the ionization signal during partial-load operation than during full-load operation.

According to the invention, the ionization signal is therefore detected at a first point of time during full-load operation I(1)NL and during partial-load operation I(1)TL, and for this first point of time a first difference D(1)=I(1)NL-I(1)TL is formed between the ionization signal during full-load operation and the ionization signal during partial-load operation. Furthermore, the ionization signal is detected at a second point of time during full-load operation I(2)NL and during partial-load operation I(2)TL, and for this second point of time a second difference D(2)=I(2)NL-I(2)TL is formed between the ionization signal during full-load operation and the ionization signal during partial-load operation. The first difference D(1) and the second difference D(2) are compared to each other, and, dependent thereon, the state of the gas burner, e.g. the state of the flame monitoring means or the sensor, is inferred, or the state of the gas burner is influenced.

The ionization signal is preferably determined at several successive points of time during full-load operation and partial-load operation. For each of these points of time a difference is formed between the ionization signal during full-load operation and the ionization signal during partial-load operation.

Dependent on a deviation between the differences of directly successive points of time, the state of the gas burner is then inferred, preferably the state of the gas burner is influenced.

It goes without saying that the degree of the partial load (e.g. 40% of the full load) as well as the full load are identical during the detection of the ionization signals for successive points of time.

In accordance with a deviation between the differences of successive points of time, the aging of the sensor supplying the ionization signal is inferred, with the degree of deviation being an indicator of the degree of aging of the sensor.

Dependent on the deviation between the above differences, a maintenance indication is activated which informs an operator that the sensor has to be exchanged. This preferably takes place when a threshold value of the deviation is exceeded. Dependent on this deviation, it can also be switched over to an emergency operation, in case of large deviations, the gas burner is preferably switched off.

In addition, the control of the gas burner can be adapted.